Health Consultation

Scope of Work - Phase II Environmental Investigation

Y Road Landfills
Whatcom County, Washington

September 17, 2001

Prepared by
The Washington State Department of Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Washington State Department of Health

Foreword

The Washington State Department of Health (DOH) has prepared this health consultation in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR). ATSDR is part of the U.S. Department of Health and Human Services and is the principal federal public health agency responsible for health issues related to hazardous waste. This health consultation was prepared in accordance with methodologies and guidelines developed by ATSDR.

The purpose of a health consultation is to identify and prevent harmful human health effects resulting from exposure to hazardous substances in the environment. The health consultation allows DOH to respond quickly to a request from concerned residents for health information on hazardous substances. It provides advice on specific public health issues. DOH evaluates sampling data collected from a hazardous waste site, determines whether exposures have occurred or could occur, reports any potential harmful effects, and recommends actions to protect public health.

For additional information or questions regarding DOH, ATSDR or the contents of this health consultation, please call the Health Advisor who prepared this document:

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Glossary

Acute	Occurring over a short period of time. An acute exposure is one which lasts for less than 2 weeks.
Agency for Toxic Substances and Disease Registry (ATSDR)	The principal federal public health agency involved with hazardous waste issues, responsible for preventing or reducing the harmful effects of exposure to hazardous substances on human health and quality of life. ATSDR is part of the U.S. Department of Health and Human Services.
Aquifer	An underground formation composed of materials such as sand, soil, or gravel that can store and/or supply groundwater to wells and springs.
Chronic	A long period of time. A chronic exposure is one which lasts for a year or longer.
Comparison value	A concentration of a chemical in soil, air or water that, if exceeded, requires further evaluation as a contaminant of potential health concern. The terms comparison value and screening level are often used synonymously.

Contaminant	Any chemical that exists in the environment or living organisms that is not normally found there.
Dose	A dose is the amount of a substance that gets into the body through ingestion, skin absorption or inhalation. It is calculated per kilogram of body weight per day.
Exposure	Contact with a chemical by swallowing, by breathing, or by direct contact (such as through the skin or eyes). Exposure may be short-term (acute) or long-term (chronic).
Groundwater	Water found underground that fills pores between materials such as sand, soil, or gravel. In aquifers, groundwater often occurs in quantities where it can be used for drinking water, irrigation, and other purposes.
Hazardous substance	Any material that poses a threat to public health and/or the environment. Typical hazardous substances are materials that are toxic, corrosive, ignitable, explosive, or chemically reactive.
Indeterminate public health hazard	Sites for which no conclusions about public health hazard can be made because data are lacking.
Inorganic	Compounds composed of mineral materials, including elemental salts and metals such as iron, aluminum, mercury, and zinc.
Media	Soil, water, air, plants, animals, or any other part of the environment that can contain contaminants.

Organic	Compounds composed of carbon, including materials such as solvents, oils, and pesticides which are not easily dissolved in water.
U.S. Environmental Protection Agency (EPA)	Established in 1970 to bring together parts of various government agencies involved with the control of pollution.
Volatile organic compound (VOC)	An organic (carbon-containing) compound that evaporates (volatilizes) easily at room temperature. A significant number of the VOCs are commonly used as solvents.

Background and Statement of Issues

The Washington State Department of Health (DOH) has prepared this health consultation in response to a request from the Whatcom County Health and Human Services Department (Whatcom County Health) to review and comment on its proposed scope of work for the second phase of environmental investigation at the Y Road landfills located in Whatcom County, Washington.

The Y Road landfills, owned and formerly operated by Whatcom County, are located on two parcels within the Carpenter Creek drainage basin, northeast of the City of Bellingham (Figure 1). Carpenter Creek discharges to Lake Whatcom, the City of Bellingham's public water supply. Both landfills contain waste disposal areas that are covered with approximately one to two feet of soil. In general, five-acre rural residential properties that use private water supply wells as a drinking water source are located north, south, and west of the landfills. Surface water including springs located near the landfills may also be used as a drinking water source.[1, 2]

DOH prepared its first health consultation for the Y Road landfills in early 1999 at the request of several Whatcom County residents. These residents were concerned that people who use drinking water in the vicinity of the landfills or who obtain their drinking water from Lake Whatcom were being exposed to harmful levels of chemicals released from the landfills. Because limited information existed about the characteristics and quality of the groundwater and surface water systems in the vicinity of the landfills, DOH could not determine whether a public health hazard existed. In response to this determination, DOH recommended that Whatcom County investigate the effect of the landfills on groundwater and surface water quality.[1]

A second health consultation was prepared by DOH in mid-1999 in response to a request from Whatcom County Health to review and comment on a proposed plan for an environmental assessment at the landfills. The plan outlined proposed tasks for investigating environmental conditions including surface water and groundwater quality at and adjacent to the landfills. Although DOH concluded that the proposed tasks would significantly reduce data gaps, it did recommend some modifications to the proposal to allow a more complete evaluation to be conducted.[2]

A third health consultation was prepared by DOH in mid-2000 after reviewing the findings from the first phase of an investigation conducted by Whatcom County at the landfills and a proposed scope of work for the second phase of investigation. Although DOH was unable to determine whether the landfill posed a risk to human health because of limitations associated with the first phase of the investigation, it did recommend procedures that could be incorporated into the second phase of investigation that would allow future assessment of health risks.[3]

Discussion

The proposed scope of work for the Y Road landfills identifies six tasks that will be conducted during the second phase of investigation at the landfills: work plan preparation; door-to-door well survey; investigation of the shallow aquifer system; groundwater monitoring at domestic wells; and surface water monitoring at Carpenter and Olsen Creeks.[4] The following items are DOH's comments regarding these tasks:

Task 1 - Work Plan Preparation

A draft and final copy of the work plan for the second phase of the investigation at the landfills should also be provided to DOH for review since it will be using the information collected during the investigation to assess potential health risks posed by the landfills.

Task 2 - Door-to-Door Survey

According to the proposed scope of work, the purpose of the door-to-door survey is to identify all domestic and irrigation wells located at properties within a 2000-foot radius of the landfill. However, a statement in the scope of work suggests that the survey will identify wells screened in the shallow aquifer. Although the identification of wells within the shallow aquifer system is very important, it is also important to know where wells within the deeper aquifer systems are located since they can be susceptible to the landfill contaminants particularly where they have not been properly installed. The door-to-door survey should identify all wells within the 2000-foot radius.

Task 3 - Focused Groundwater Investigation (Perched Aquifers)

Geoprobes are proposed to be installed at the landfills to determine waste depths; validate the conceptual model of the shallow aquifer system; determine shallow aquifer water elevations; and quantitatively assess landfill leachate effects on the shallow groundwater system. Subsurface information gained from the geoprobe installations may be used to design a groundwater monitoring system. The criteria for determining whether a groundwater monitoring well system will be installed at the landfills, however, was not provided in the scope of work. DOH recommends that the criteria be included in the work plan.

Twenty to thirty geoprobe locations are proposed to be installed within the landfill boundaries. It is not clear from the scope of work whether this means the waste boundaries or the landfill property boundaries. DOH recommends that geoprobes installed within the waste boundaries not penetrate the underlying aquifer. This will reduce the chance of contaminants being carried downward into native soils and the underlying aquifer. Groundwater or leachate samples collected from the geoprobes installed in the waste can provide good information about water quality within the landfills if samples are collected appropriately. Geoprobes installed at and

outside of the waste boundaries can provide good information about the landfills' effect on the shallow groundwater system.

Whatcom County Health is proposing to use a peristaltic pump to sample groundwater at the geoprobe locations. This sampling technique can result in degassing and loss of volatile organic compounds (VOCs), common chemicals of concern at landfills.[5] DOH recommends that other groundwater sampling techniques be evaluated and the technique that provides for the collection of the most representative groundwater samples be selected. If a peristaltic pump is the only type of pump suitable for groundwater sampling at the geoprobes then a procedure should be developed and described in the work plan to minimize the effect of the equipment on the sample results.

Groundwater samples collected from the geoprobes will be screened using indicator parameters including specific conductance, dissolved oxygen, chloride, and total and dissolved barium, iron, and manganese. Because VOCs are a common landfill contaminant, DOH recommends that some VOCs that are commonly detected at landfills such as vinyl chloride be added to the indicator parameter list.

Six of the groundwater samples with relatively high concentrations of the indicator parameters are proposed to be analyzed for an expanded suite of organic and inorganic chemicals. It is not clear from the scope of work, however, that this approach is appropriate for establishing a correlation between indicator parameter results and the expanded organic and inorganic analytical results. DOH recommends that a discussion be included in the work plan explaining how a correlation will be established between indicator parameter results and the expanded organic and inorganic analytical results. Whatcom County Health should consider consulting a statistician regarding this issue.

One-time, grab groundwater samples collected from geoprobes are proposed for the second phase of the environmental investigation. These samples, although good screening tools, are not appropriate for determining whether the Y Road landfills are a potential threat to groundwater quality. A permanent groundwater monitoring system that will allow for the collection of seasonal groundwater level data and samples is necessary for evaluating whether the landfill poses a risk to human health.

Task 4 - One-time Groundwater Monitoring (Water Supply Wells)

Water supply wells that are at the highest potential risk from contaminants leaching from the landfill should be sampled during the second phase of the investigation. Additional groundwater sampling at water supply wells should be conducted in the future, as appropriate, based on groundwater monitoring results.

Task 5 - Quarterly Surface Water Sampling (Carpenter Creek)

Carpenter Creek is potentially affected by contaminated groundwater migrating from the landfill. Groundwater flow information obtained during the second phase of the investigation should be used to evaluate whether the previous Carpenter Creek surface water sampling locations are appropriate for subsequent sampling events. Groundwater flow information should also be used when selecting seep sampling locations.

Task 6 - One-time Surface Water Sampling (Olsen Creek)

It is unknown whether Olsen Creek is located downgradient of the Y Road landfills. Decisions about sampling locations and sampling frequency at the creek should made after a determination has been made about the creek's relationship to the landfill.

Chemical Exposure and Children

The Y Road landfills are located in a rural, residential area where children potentially could be exposed to landfill contaminants through the groundwater and surface water pathways. Children can be uniquely vulnerable to the hazardous effects of environmental contaminants. When compared to adults, pound for pound of body weight, children drink more water, eat more food, and breathe more air. Children have a tendency to play closer to the ground and often put their fingers in their mouths. These facts lead to an increased exposure to contaminants in various environmental media. Additionally, the fetus is highly sensitive to many chemicals, particularly with respect to potential impacts on childhood development. For these reasons, it is very important to consider the specific impacts that contaminants may have on children, as well as other sensitive populations.

Conclusions

The Y Road landfills pose an indeterminate health risk because limited information is available about the potential effects of the landfills on environmental media, particularly groundwater and surface water. The second phase of the environmental investigation, as proposed, will fill some of the data gaps. However, the remaining data gaps will prevent DOH from making a health determination.

Recommendations/Public Health Action Plan

1. Whatcom County Health should incorporate DOH's suggested changes into the final scope of work and work plan for the second phase of the environmental investigation at the landfills.

2. Whatcom County should provide future plans and reports for the Y Road landfills to DOH for review.

References

1. Health Consultation, Y Road Landfill (1 of 2), Northeast of Bellingham, Whatcom County, Washington, Washington State Department of Health, March 13, 2000.

2. Health Consultation, Y Road Landfill (2 of 2), Northeast of Bellingham, Whatcom County, Washington, Washington State Department of Health, March 13, 2000.

3. Health Consultation, Phase I Hydrogeologic Investigation, Y Road Landfills, Whatcom County, Washington, Washington State Department of Health, October 2000.

4. Exhibit A, Proposed Scope of Services for Y Road landfills, BEK Engineering and Environmental, Project 200170, undated.

5. RCRA Ground-Water Monitoring: Draft Technical Guidance, U.S. Environmental Protection Agency, Office of Solid Waste, November 1992.

Certification

This Health Consultation was prepared by the Washington State Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

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The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

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